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Energy density fluctuations in de Sitter space

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ABSTRACT: Quantum fluctuations in de Sitter space or in the de Sitter phase of an inflationary universe give rise to a spectrum of classical energy density perturbations which is scale invariant. The analysis presented in this letter is based on a consistent expansion in powers of $\hbar$, and on the functional Schroedinger approach to quantum field theory in de Sitter space. The result holds for a large class of initial states of the quantum field, including the Bunch-Davies vacuum.

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